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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/777,681

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Kazuo Hakamata

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11/02/2005

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EXAMINER

LEE, SHUN K

ART UNIT

PAPER NUMBER

2884

DATE MAILED: 11/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/777,681

Applicant(s)

HAKAMATA, KAZUO

Examiner

Shun Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 August 2005.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 and 20-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 and 20-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 February 2001 and 26 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

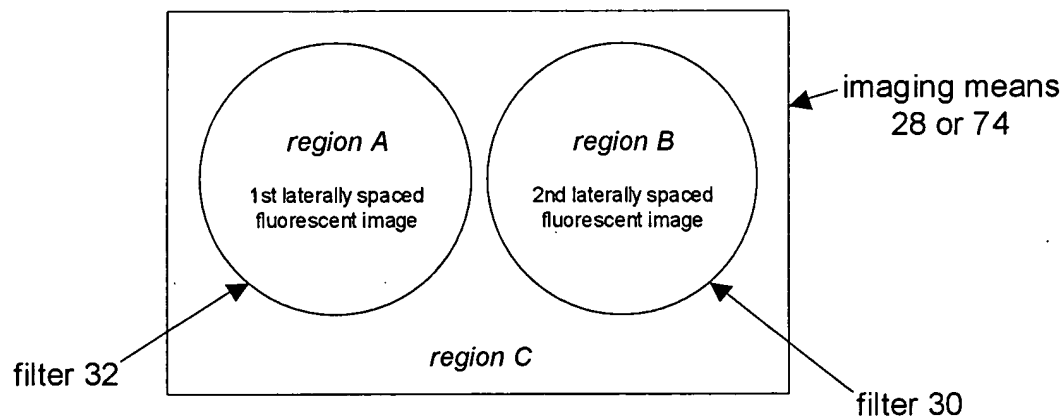
1. Claim 25 is objected to because of the following informalities: "an outer boundary to a third boundary" on line 2 in claim 25 should probably be --a third outer boundary--. Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-5, 8, 10, 11, and 20-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lazarev *et al.* (US 5,986,271) in view of Wilder *et al.* (US 5,262,871).



In regard to claims 1-4 and 8, Lazarev *et al.* disclose (Figs. 2, 3, and 8) a fluorescence imaging apparatus, comprising:

- (a) excitation light irradiating means (16) for irradiating excitation light to a measuring site (51), the excitation light causing the measuring site (51) to produce fluorescence (column 5, lines 1-3),
- (b) imaging means (28 or 74) for imaging the fluorescence, which has been produced from the measuring site (51) when the excitation light is irradiated to the measuring site (51), wherein the imaging means (28 or 74) is provided with an image sensor (e.g., a charge transfer type image sensor; column 11, lines 45-55), which comprises a plurality of pixels arrayed in two-dimensional directions and which has a fluorescence imaging region (e.g., an area within region A and/or B) utilized for the imaging of the fluorescence and a non-imaging region other than the fluorescence imaging region, wherein said non-imaging region consisting of a region (*i.e.*, region C) where no fluorescence is received (since a pair of rhomboidal prisms 144, 146 in Fig. 8 or a pair of optical wedges 76 in Fig. 2 is used to produced laterally spaced images that pass through respective ones of filters 30, 32; column 6, lines 50-65; column 10, lines 56-67), and
- (c) imaging control means (34) for controlling operations of the imaging means (28 or 74).

The apparatus of Lazarev *et al.* lacks that the imaging control means controls such that, when signal charges are to be read from the image sensor (e.g., a random access type image sensor), signal charges which have been accumulated in pixels falling within the non-imaging region are read (*i.e.*, quick reading or binning reading) and/or prevented from being read. Wilder *et al.* teach (abstract; column 6, lines 40-44; column 17, lines

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64-66) a random access type image sensor wherein multiple regions of interest with each region having a resolution that can be independent of other regions of interest and that all pixels can be read or alternatively some pixels are unread (*i.e.*, prevented from being read). Wilder *et al.* further teach (column 18, lines 7-12) that unimportant pixels can be quickly read out as parts of large superpixels (*i.e.*, binning reading) in order minimize the time consumed in reading unimportant pixels. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention that unimportant pixels (*e.g.*, pixels in regions other than the fluorescence imaging region) in the apparatus of Lazarev *et al.* are read (*i.e.*, quick reading or binning reading as parts of large superpixels) and/or prevented from being read, in order to minimize the time consumed in reading unimportant pixels as taught by Wilder *et al.*

In regard to claim **5** which is dependent on claim 3 or 4, the apparatus of Lazarev *et al.* lacks that the image sensor is provided with a clearing section for clearing signal charges, which have been accumulated in pixels. Wilder *et al.* also teach (column 17, line 62 to column 18, line 6) a first reading frame (*i.e.*, clearing section) where pixel signals are discarded in order to prevent spurious data. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide a clearing section (*i.e.*, first reading frame) in the apparatus of Lazarev *et al.*, in order to prevent spurious data as taught by Wilder *et al.*

In regard to claims **10** and **11** (which are dependent on claim 3), claim **20** (which is dependent on claim 1), claim **21** (which is dependent on claim 2), and claim **22** (which is dependent on claim 8), the apparatus of Lazarev *et al.* lacks that the imaging control

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means store data indicating which regions of the image sensor corresponds to non-imaging areas (e.g., on a line by line basis) and regions of reading, prevention of reading, quick reading, or binning of signal charges based on the stored data.

Wilder *et al.* teach (column 4, lines 45-66) that the readout is controlled with supervisory signals from a processor/computer with predetermined pixel readout instructions (i.e., stored data). Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention that control of the readout in the apparatus of Lazarev *et al.* occurs via predetermined pixel readout instructions as taught by Wilder *et al.*

In regard to claims **23**, **25**, and **26**, which are dependent on claim 1, Lazarev *et al.* also disclose (Fig. 3) that said image sensor has at least four boundaries and that said fluorescence imaging region does not extend to a fourth outer boundary of the image sensor. The apparatus of Lazarev *et al.* lacks an explicit description that said fluorescence imaging region extends to an outer boundary of the image sensor on at least two opposite boundaries of the image sensor and extends to a third outer boundary of the image sensor. However, Lazarev *et al.* further disclose (Fig. 3) that the fluorescence imaging region is within the four boundaries of the image sensor. Absent persuasive evidence that a particular position of the fluorescence imaging region relative to the four boundaries of the image sensor is a critical parameter, it would have been obvious to one having ordinary skill in the art at the time of the invention to position a circular fluorescence imaging region (as defined by the apertures of the optics) relative to the rectangular sensitive area of the image sensor in the apparatus of

Lazarev *et al.* so as to maximize the area of the circular fluorescence imaging region (e.g., by positioning the fluorescence imaging region to extend to three outer boundaries of the image sensor).

In regard to claim **24** which is dependent on claim 1, Lazarev *et al.* also disclose (column 2, lines 48-53) that the image sensor includes only a single fluorescence imaging region, and a display outputs an image based on light signals received only from the single fluorescence imaging region (column 2, lines 4-11).

4. Claims 6, 7, 9, and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lazarev *et al.* (US 5,986,271) in view of Wilder *et al.* (US 5,262,871) as applied to claims 3-5 above, and further in view of Talmi *et al.* (US 5,821,547).

In regard to claim **6** (which is dependent on claim 3 or 4) and claim **7** (which is dependent on claim 5), Lazarev *et al.* also disclose (Fig. 3) that a fluorescence imaging region (e.g., 30) is located at a position shifted from a center position on an imaging surface of the image sensor (28). The modified apparatus of Lazarev *et al.* lacks that the image sensor is provided with horizontal shifting means, from which the signal charges are read in one direction, the imaging control means controls such that the signal charges having been accumulated in the pixels are transferred to the horizontal shifting means and are then read from the horizontal shifting means, and the fluorescence imaging region is located at a position shifted from a center position on an imaging surface of the image sensor toward a side corresponding to a read-out side of the horizontal shifting means, and said fluorescence imaging region of said image sensor is the only imaging region on said image sensor. Talmi *et al.* teaches (column 4,

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line 58 to column 5, line 3) a horizontal shifting means (*i.e.*, shielded portion) such that the signal charges having been accumulated in the pixels are transferred to the horizontal shifting means in order to increase the signal to noise (column 5, lines 21-40). Lazarev *et al.* further disclose (column 2, lines 48-53) that alternatively, in lieu of beamsplitters and individual optical filters, an electro-optical filter (*e.g.*, a liquid crystal filter) is controlled to pass the reflected illumination light in a first time period, the first wavelength range in a first portion of the second time period, and the second wavelength range in a second portion of the second time period. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide a horizontal shifting means for a single off-centered fluorescence imaging region (30) in the modified apparatus of Lazarev *et al.*, in order to increase the signal to noise as taught by Talmi *et al.*

In regard to claim **9** (which is dependent on claim 3) and claim **12** (which is dependent on claim 6), the modified apparatus of Lazarev *et al.* lacks that the non-imaging region is blocked by an opaque film. Talmi *et al.* teaches (column 1, lines 34 and 35) light shielded dark reference rows and columns surround the active area. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide an opaque film for the non-imaging region in the modified apparatus of Lazarev *et al.*, in order to provide dark reference rows and columns as taught by Talmi *et al.*

In regard to claims **13** and **14** which are dependent on claim 6, Wilder *et al.* is applied as in claims 10 and 11 above.

Response to Arguments

5. Applicant's arguments filed 15 August 2005 have been fully considered but they are not persuasive.

Applicant argues (first paragraph on pg. 10 of remarks filed 15 August 2005) that the focus is always variable since column 6, lines 37-39 expressly disclose focusing of lens 70. Examiner respectfully disagrees. Lazarev *et al.* state (column 6, lines 37-39) that "Beam splitter assembly 58 also includes a coupling lens 70 for focusing the reflected image onto the image plane of color image pickup device 22". The passage cited by applicant only teach a lens for focusing an image onto the image plane of a device. There is nothing within the cited passage to suggest that the focus is variable. Therefore, applicant's arguments are not persuasive.

Applicant argues (second paragraph on pg. 10 of remarks filed 15 August 2005) that the characteristics of the lenses themselves would not necessarily dictate whether the non-imaging area is *a priori* known or not since the spread or lack thereof of illuminating light may also determine how much of an image will appear or not appear in the circular regions A and B and the extent of darkness of the alleged non-imaging region C in Lazarev *et al.* Examiner respectfully disagrees. The clear physical aperture of the lenses (and the clear physical aperture of other optical components such as apertures, filters, etc.) define regions A and B. The possibility that the image within the regions A and B contain regions of low intensity is immaterial to the fact that the perimeter of regions A and B is defined by the clear physical aperture of the optical components.

Applicant argues (third paragraph on pg. 10 of remarks filed 15 August 2005) that the control signals may relate to matters such as gain, which are not related to the positional extent of a pixel reading. Examiner respectfully disagrees. Wilder *et al.* state (column 4, lines 57-66) that "The supervisory signals control the operation and readout mode of the sensor 10. The supervisory signals produced by the processor/computer 18 and applied to the decoders 12 and 14 may be generated as a result of the processing and analysis of the data previously received from sensor 10. Alternatively, the supervisory signals may be generated by the processor/computer pursuant to predetermined pixel readout instructions supplied to the processor/computer through conventional input devices (not shown)". The key phrase is "readout mode". Thus Wilder *et al.* expressly teach supervisory signals which control the readout mode of the sensor. That Wilder *et al.* teach additional supervisory signals to control the operation (e.g., gain) of the sensor is immaterial to the fact that supervisory signals are used to control the readout mode of the sensor.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not

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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shun Lee whose telephone number is (571) 272-2439. The examiner can normally be reached on Tuesday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SL



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